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Scanning Tunneling Microscopy of Fe Impurities in $Bi_2Sr_2CaCu_2O_{8+d}$ MICHAEL BOYER, BRIAN KOOPMAN, LING FU, Clark University, W.D. WISE, KAMALESH CHATTERJEE, MIT, GENDA GU, Brookhaven National Laboratory, E.W. HUDSON, Penn State University —
We utilize scanning tunneling microscopy measurements to probe the effects of intentionally doped magnetic Fe impurities in the high-temperature superconductor $Bi_2Sr_2CaCu_2O_{8+d}$. Our spectroscopy measurements indicate an absence of particle-hole symmetry in impurity affected regions. In addition, we find evidence that the Fe impurities which substitute for Cu atoms in the CuO_2 plane are shifted from their expected locations. Both of these findings are in contrast to previous STM measurements on magnetic Ni impurities in $Bi_2Sr_2CaCu_2O_{8+d}$ which find spectra which are overall particle-hole symmetric and centered at Cu sites.[1] Interpretations of our measurements may help us understand on a local scale why introduced Fe impurities are more detrimental to superconductivity than Ni impurities as determined by bulk measurements.[2] [1] E.W. Hudson et al., Nature 411, 920 – 924 (2001). [2] T.D. Hien et al., J. Magn. Magn. Mater. 262, 508 – 513 (2003).

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